Level Devil® *Systems*

9142 Plug and Play Satellite Communicator

QuickStart Software

"The Level Gauging Experts"

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Features

The 9142 System

The 9142 is a low cost, easy to install, bi-directional satellite modem capable of monitoring and sending remote site information from any global position. Vital information from a site is delivered to a computer connected to the Internet. Standard analog sensors and/or switch contacts may be monitored. The Plug & Play features of the 9142 make it useful for Vendor Managed Inventory (VMI), waste water lift stations, remote storage tank locations, pipelines, rail crossing, chemical and oil plants, remote weather stations, irrigation fields and any other place where dispatching personnel is involved. Reports are issued at timed intervals, upon alarm zone changes, or both. The unit may also be polled on demand.

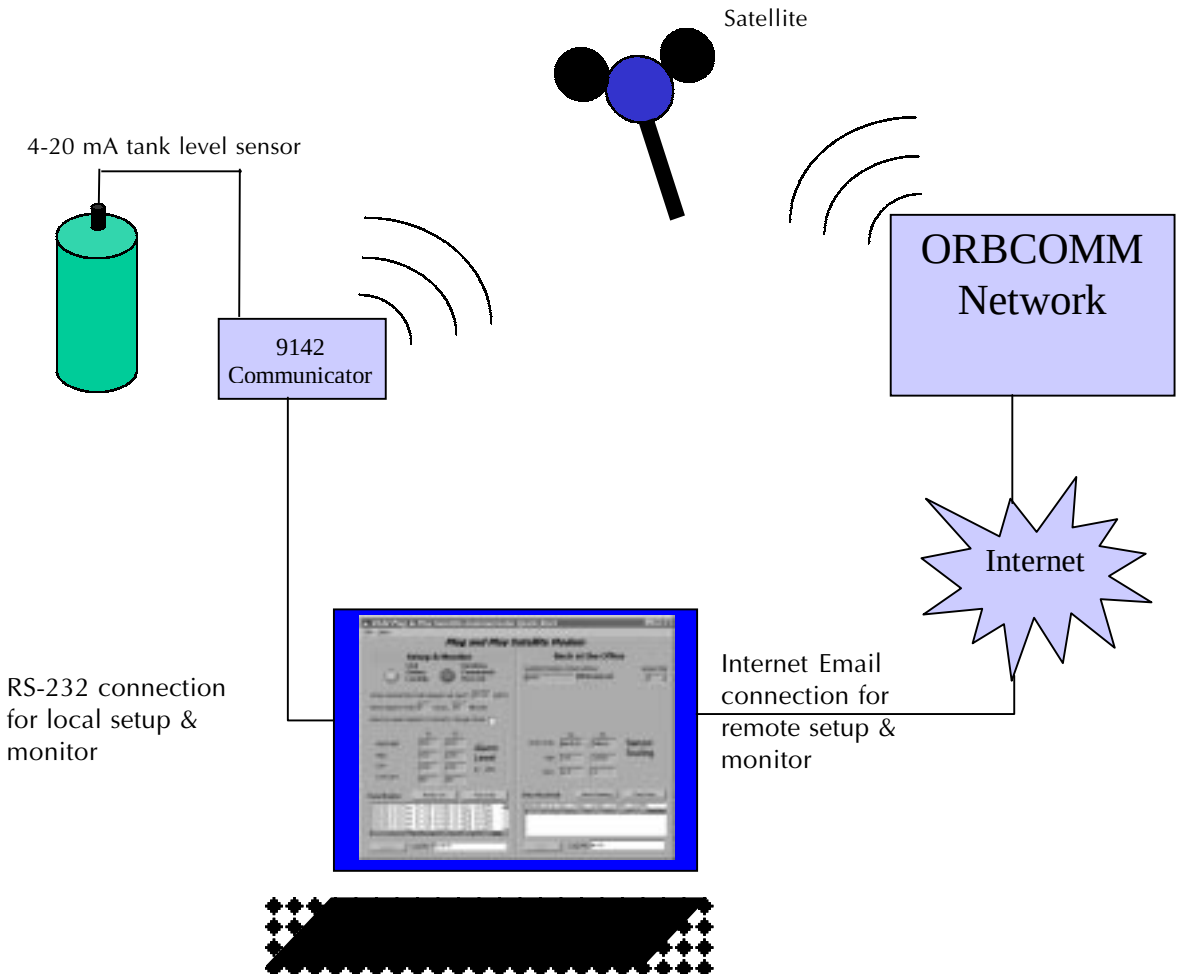


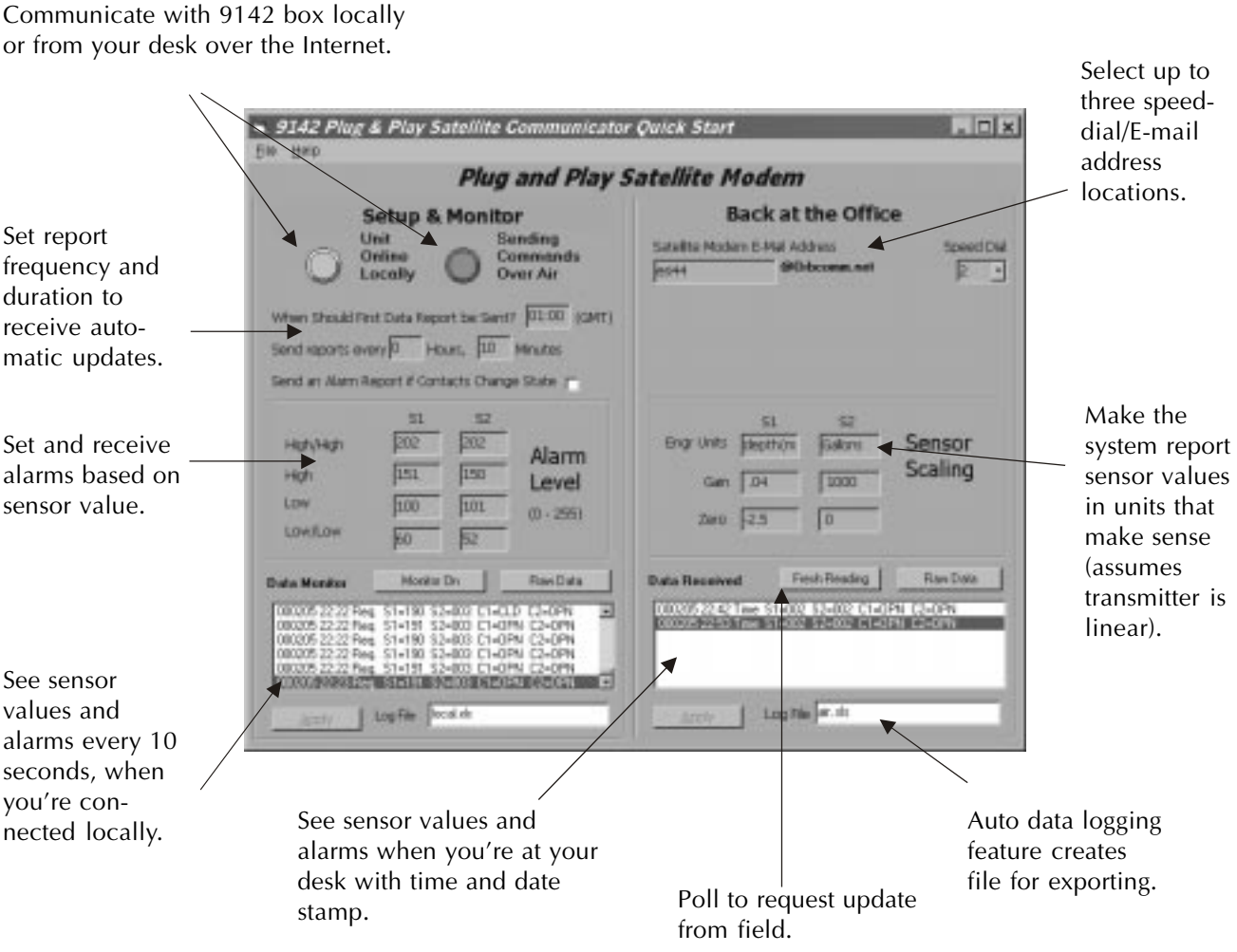
Figure 1. System Overview

Features

The 9142 Software

Graphic User's Interface Layout

The Model 9142 Plug & Play Satellite Communicator QuickStart Software is used to configure the Model 9142 for alarms and reporting frequency, perform simple diagnostics, and to receive and decode E-mails directly from the ORBCOMM® satellite network via Internet E-mail (MAPI) software. (Example: Microsoft Outlook®, Outlook Express® or Lotus Notes®).


Communicate with 9142 box locally or from your desk over the Internet.
Select up to three speed-dial/E-mail address locations.
Set report frequency and duration to receive auto-matic updates.
Set and receive alarms based on sensor value.
Make the system report sensor values in units that make sense (assumes transmitter is linear).
See sensor values and alarms every 10 seconds, when you're con-nected locally.
See sensor values and alarms when you're at your desk with time and date stamp.
Poll to request update from field.
Auto data logging feature creates file for exporting.
9142 Plug & Play Satellite Communicator Quick Start
Plug and Play Satellite Modem
Setup & Monitor
Back at the Office
Alarm Level
Sensor Scaling

Data Legend:

S1 - Analog sensor #1
S2 - Analog sensor #2
C1 - Contact closure #1 , OPN = open & CLD = closed
C2 - Contact closure #2 , OPN = open & CLD = closed

Setting up for Satellite Communications

Provisioning the Satellite Communicator

The 9142 MUST be provisioned BEFORE the unit is Satellite ready. Provisioning the 9142 must be done by the communications provider. See the section entitled "Provisioning" in the 9142 Installation Manual for more details.

Software Settings

E-mail Address

You can select the 9142 unit to talk to you and where you want the data to be sent. In the "**Back at the Office**" window, fill out the following fields:

- **Satellite Modem E-Mail Address** . . . the E-mail address used to communicate with the PNP (Plug and Play) Satellite unit.

- **Speed** . . . select the speed dial from the drop down list that matches the one you are using. Your satellite E-mail provider provisions the speed dial (typically #2).

Setting up Alarm Levels

Alarms are based on a scale of 0 to 255. All sensor readings are converted by the satellite unit to this scale.

In the "**Alarm Level**" window, enter in the **HIGH/HIGH** field the highest alarm in counts (the alarm settings range from 0 to 255 counts). The maximum setting for an alarm is 255.

Enter in the **HIGH** field the HIGH alarm, which is an intermediate alarm and should be set less than the **HIGH/HIGH** alarm.

Enter in the **LOW** field the LOW alarm, which is an intermediate alarm and should be set less than the **HIGH** alarm but more than the **LOW/LOW** alarm. The minimum setting is 0 (zero).

Enter in the **LOW/LOW** field the LOW/LOW alarm, which is the lowest alarm and should be set below the **LOW** alarm. The minimum setting is 0 (zero).

To disable an alarm zone, set it equal to 255 for high or 0 for low.

Software Settings (continued)

Setting up the Report Format

In the "**Setup & Monitor**" window, fill out the following fields:

- **When Should First Data Report be Sent?** . . . enter the time you want the first report to be sent. You must use Greenwich Mean Time (GMT), 24 hour format. Example: if you want the unit to report at 1:00 pm Central Standard Time (CST) you would enter 19:00 because 1:00 pm (GMT) plus 6 hours behind (CST) equals 7:00 (GMT) plus 12 for 24 hour format equals 19:00. (Central Standard Time is 6 hours behind Greenwich Mean Time; Central Daylight Time is 5 hours behind Greenwich Mean Time).

- **Send Reports Every** . . . enter the interval in hours and minutes you want the unit to send data. Your monthly service bill will be affected by this setting. Contact your service provider for rate plans.

- **Send an Alarm Report if Contacts Change States** . . . check this box if you want the unit to send an alarm report when an alarm condition changes.

Monitoring the Sensor Locally

Connecting the 9142 to a Laptop

By using a RJ11-style to RS232 cable (accessory), connect the RJ11-style end to either COM1 or COM2 of the 9142 and the RS232 end to the RS232 port of the laptop. See the 9142 Installation Manual for more details.

Communicating With the Satellite Locally

In the "**Setup & Monitor**" window, click "**Unit Online Locally**" to connect the satellite unit through a RS232 cable connection. This button turns green when activated.

Monitoring and Controlling Data Remotely

Switching From Local to Satellite Communicator

To switch from monitoring the sensor locally to monitoring and controlling the sensor's data remotely through the satellite and E-mail, click "**Sending Commands Over Air**" in the "**Setup & Monitor**" window. You MUST click this button before disconnecting an RS232 connection to set the unit to transmit by satellite. This button turns green when activated. Now, commands and data will be directed through the satellite.

If you are deploying a 9142 to the field, you can set it up to transmit over the satellite before you release it from local testing or you can communicate with it after it has been installed.

Viewing Data

Data can be viewed in the 2 text boxes, **Data Monitor** and **Data Received**, at the bottom of the main ***Plug and Play Satellite Modem*** window.

The "**Apply**" button is enabled only when changes are made to the current settings, and applies the current settings in it's frame when clicked.

Data Monitor

The **Data Monitor** is the text box on the left side of the window and is used to monitor the PNP Satellite unit's data when setting up the unit while in local mode.

The "**Monitor On**" button indicates the present status of the **Data Monitor** text box. "**Monitor On**" means a test mode where data is requested about every 10 seconds. "**Monitor Off**" means the box is not active and no data will be displayed or updated.

Data can be displayed in 2 different modes. By clicking the "**Raw Data/Scaled Data**" button, "**Raw Data**" indicates that raw counts (0-255) are displayed and "**Scaled Data**" indicates that the data has been converted to display the scaled data (gallons, inches, pounds, etc.). Tank levels and alarms will always be sent and displayed every 10 seconds when you're connected locally with "**Monitor On**".

Enter into the "**Log File**" field the name of the file that will be used to log the data received from the PNP Satellite Communicator. Either a text (.txt) or Microsoft Excel® (.xls) file format extension may be used.

Data Received

The **Data Received** is the text box on the right side of the window and is used to display data from satellite E-mail.

The "**Fresh Reading**" button will sent a request to the satellite communicator to send the latest data. The "**Sending Commands Over the Air**" button MUST be active (green) for this to work.

Data can be displayed in 2 different modes. By clicking the "**Raw Data/Scaled Data**" button, "**Raw Data**" indicates that raw counts (0-255) are displayed and "**Scaled Data**" indicates that the data has been converted to display the scaled data (gallons, inches, pounds, etc.).

Enter into the "**Log File**" field the name of the file that will be used to log the data received from the PNP Satellite Communicator. Either a text (.txt) or Microsoft Excel® (.xls) file format extension may be used.

Viewing Data (continued)

Scaling Sensor Data for Easy Reading

Sensor scaling allows the user to read the data in different Engineering units, such as gallons, inches or pounds, whenever the "**Scaled Data/Raw Data**" button is clicked to "**Scaled Data**".

Engineering Units

In the "**Sensor Scaling**" window, enter the "**Engineering Units**" for **S1** &/or **S2** (S1 = sensor/channel #1).

Gain

Next, figure the **Gain**. The Gain is the ratio of Engineering units to Raw Data Counts.

$$\textbf{Gain} = \frac{\textbf{Scaled Data}}{\textbf{Raw Data}}$$

In order to figure the **Gain** and **Zero** settings, you must take 2 raw data readings at 2 different levels at known Engineering values. **Note:** In order to set up the scaled units, you must be able to change the sensor's output.

Example: **Reading #1:** 185 raw data counts equals 20,956 units (ie. gallons)
Reading #2: 128 raw data counts equals 12,512 units (ie. gallons)

$$\textbf{Gain} = \frac{\textbf{1st Engineering Units minus 2nd Engineering Units}}{\textbf{1st Raw Counts minus 2nd Raw Counts}}$$

Example:

$$\textbf{Gain} = \frac{20{,}956 - 12{,}512}{185 - 128} = \textbf{48.1}$$

Enter the **Gain** setting and click "**Apply**".

Zero

The **Zero** setting is the Engineering units associated with 0 (zero) raw data counts.

To figure the **Zero** setting, click "**Unit Online Locally**" and the "**Scaled Data**" button. When a scaled reading corresponding with a known Engineering unit occurs, subtract this reading from the known Engineering value. Enter this number as the "**Zero**" setting. If the number comes up being minus (-), be sure to include the minus (-) sign with the number.

Example:

12,512 (actual Engineering units)
- 18,327 (current displayed scaled data units)
- 5,815 (this number is the "**Zero**" setting)

Enter the **Zero** setting and click "**Apply**". Readings will now be displayed in the correct scale.

Viewing Data (continued)

Data Formats

There are 4 basic data formats that can be displayed: **Requested**, **Timed**, **Alarm** and **Free** formats. Each format can be displayed in either Raw Data or Scaled Data mode. The format of each line is: **Year-Month-Day**, **Time** and **Data**.

Examples:

Requested Data Format:
#2000-01-26 16:06:04#, "Req.", S1 = 232, S2 = 126, OPN, CLD (Raw Data Mode)
#2000-01-26 16:06:04#, "Req.", 2.32E +02, 1.26E +04, OPN, CLD (Scaled Data Mode)

Timed Data Format:
#2000-01-26 16:06:04#, "Time", S1 = 232, S2 = 126, OPN, CLD (Raw Data Mode)
#2000-01-26 16:06:04#, "Time", 2.32E +02, 1.26E +04, OPN, CLD (Scaled Data Mode)

Alarm Data Format:
#2000-01-26 16:06:04#, "A1:4", 97, 2, OPN, CLD

Free Data Format:
#2000-01-26 16:06:04#, 0-34 1-2 2-1 3-14 4-16 5-0

Requested (and Timed) Data Format Breakdown:

Raw Data Mode:

#2000-01-26 16:06:04#, "Req.", S1 = 232, S2 = 126, OPN, CLD

Year-Month-Day, Time:	#2000-01-26 16:06:04#
Reason:	"Req." (Requested) or "Time" (Timed)
Channel #1 Data:	S1 = 232 (232 raw data counts)
Channel #2 Data:	S2 = 126 (126 raw data counts)
(Contact #1) Channel #3 Data:	OPN (contact open)
(Contact #2) Channel #4 Data:	CLD (contact closed)

Scaled Data Mode:

#2000-01-26 16:06:04#, "Req.", 2.32E +02, 1.26E +04, OPN, CLD

Year-Month-Day, Time:	#2000-01-26 16:06:04#
Reason:	"Req." (Requested) or "Time" (Timed)
Channel #1 Data:	2.32E +02 (the +02 means the decimal point is moved 2 places to the right. Thus, 2.32E +02 is 232.0 inches, or whatever the Engr. units are set to)
Channel #2 Data:	1.26E +04 (the +04 means the decimal point is moved 4 places to the right. Thus, 1.26E +04 is 12,600.0 gallons, or whatever the Engr. units are set to)
(Contact #1) Channel #3 Data:	OPN (contact open)
(Contact #2) Channel #4 Data:	CLD (contact closed)

Viewing Data (continued)

Data Formats (continued)

Alarm Data Format Breakdown:

#2000-01-26 16:06:04#, "A1:4", 97, 2, OPN, CLD

Year-Month-Day, Time:	#2000-01-26 16:06:04#
Reason:	"A1:4" (Alarm Channel 1, Zone 4) Zone 1 = Low Low Level Alarm Zone 2 = Low Level Alarm Zone 3 = OK Level Alarm (no alarm state) Zone 4 = High Level Alarm Zone 5 = High High Level Alarm
Channel #1 Data:	97 (97 raw data counts)
Channel #2 Data:	2 (2 raw data counts)
(Contact #1) Channel #3 Data:	OPN
(Contact #2) Channel #4 Data:	CLD

Free Data Format Breakdown:

#2000-01-26 16:06:04#, 0-34 1-2 2-1 3-14 4-16 5-0

Year-Month-Day, Time:	#2000-01-26 16:06:04#
Byte 0:	34
Byte 1:	2
Byte 2:	1
Byte 3:	14
Byte 4:	16
Byte 5:	0

Managing Multiple 9142 Boxes

The 9142 Plug and Play Quick Start program is designed to get the user up and running in a single unit mode. If several units are to be managed, the TankView program might be a consideration.

Application Notes

Setting up Microsoft Outlook Express®

The Plug and Play Quick Start Software will integrate with your existing E-mail system on the computer you install it on. It uses MAPI (Message Application Program Interface) provided by Microsoft®.

It should be transparent on your system, but if you experience problems, contact your E-mail administrator.

1. Must have an E-mail program already setup and functional, with a valid E-mail address.
2. Must have your E-mail address provisioned by your ORBCOMM® service provider.
3. Must set the default E-mail profile (Mailbox) in your E-mail program (Outlook®, Outlook Express®, etc.) to the profile with the E-mail address provisioned by your ORBCOMM® service provider.
4. Check Internet Explorer® setting for correct default E-mail program.
5. Have your ORBCOMM® service provider ping your E-mail box.

Using the Log Files

The log file is the name of the file that is used to log and store data received from the PNP Satellite Communicator. When the .xls file format is used, the log files can be imported into Microsoft Excel®. When the .txt file format is used, the log files can be opened as a text document.

Troubleshooting

"I don't see any monitor data, locally"

- is the "Unit Online Locally" green?

- check power to the 9142.

- check cable connections at the 9142 and at your computer comport.

- is your comport setup correctly in Windows®?

- check File / Settings for correct comport number.

- did the PNP Quick Start software get installed with no errors?

- contact your 9142 supplier.

"I don't see any received data, over the air"

- is the "Sending Command Over Air" green?

- is the E-mail address correct?

- have you provisioned the 9142 through an ORBCOMM® service provider?

- after sending a command, can you see the command in your E-mail sent box?

- is the received message in your E-mail box un-opened?

- contact your 9142 supplier.